



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER
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ATLANTA, GEORGIA 30303-8960

MAR 22 2016

Mr. Thomas Frick
Director
Division of Environmental Assessment & Restoration
Florida Department of Environmental Protection
Mail Station 3000
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Frick:

The U.S. Environmental Protection Agency has completed its review of the numeric interpretation of the state narrative nutrient criterion (NNC) for total nitrogen (TN) in Lake Lena (WBID 1501) and Deer Lake (WBID 1521P). FDEP submitted the Lake Lena Total Maximum Daily Load (TMDL) (WBID 1501) and Deer Lake TMDL (WBID 1521P) and revised Chapter 62-304, Florida Administrative Code (F.A.C.) including the NNC for the subject waters, to the EPA on June 30, 2015, as TMDLs and as new or revised water quality standards (WQS) with the necessary supporting documentation and certification by FDEP General Counsel, pursuant to 40 CFR Part 131. The NNC were adopted under Chapter 62-304.625(15) as site specific numeric interpretations of paragraph 62-302.530(47), F.A.C., as referenced in paragraph 62-302.531(2)(a), F.A.C. FDEP intends for the submitted NNC to serve in place of the otherwise, applicable criteria for lakes set out in paragraph 62-302.531(2)(b), F.A.C.

FDEP submitted the Lake Lena TMDL (WBID 1501) and Deer Lake TMDL (WBID 1521P) to the EPA for review pursuant to both CWA Sections 303(c) and 303(d) since the TMDLs will also act as a Hierarchy 1 (H1) site-specific interpretation of the state's narrative nutrient criteria pursuant to 62-302.531(2)(a)1.a. The EPA acknowledges that by virtue of establishing the TMDLs in Chapter 62-304, F.A.C., the FDEP is also establishing an H1 interpretation of the narrative nutrient criteria for these waterbodies as new or revised WQS. The enclosed, combined WQS and TMDL decision documents summarize the EPA's review and approval of the WQS and TMDLs.

In accordance with Sections 303(c) and (d) of the Clean Water Act, I am hereby approving the TMDL promulgated in Chapter 62-304, F.A.C for Lake Lena (WBID 1501) and Deer Lake TMDL (WBID 1521P) as both a TMDL and as revised water quality standard for total nitrogen (TN). Any other criteria applicable to these waterbodies remain in effect, especially those related to chlorophyll *a* in paragraph 62-302.531(2)(b)1., and including other applicable criteria at 62-302.531(2)(b). The requirements of paragraph 62-302.530(47)(a), F.A.C. also remain applicable.

If you have any comments or questions relating to the approval of the H1 WQSs or TMDLs, please contact me at (404) 562-9345, or have a member of your staff contact Dr. Katherine Snyder in the WQS program at (404) 562-9840 or Ms. Laila Hudda of the TMDL program at (404) 562-9007.

Sincerely,



James D. Giattina
Director
Water Protection Division

cc: Mr. Craig D. Varn, FDEP
Mr. Daryll Joyner, FDEP
Ms. Erin Rasnake, FDEP

Enclosure

Florida Numeric Interpretation of the Narrative Nutrient Water Quality Criteria through a TMDL to establish a Hierarchy 1 (H1): Joint Water Quality Standards and TMDL Decision Document

Summary Waterbody Information

TMDL Document Name: Nutrient TMDL Report for Deer Lake (WBID 1521P)	County: Polk County
Reviewer(s): Laila Hudda, Simona Platukyte	Date of Submittal: June 30, 2015 December 7, 2015 (revised)
Use Classification: Class III Freshwater	WBID/HUC: 1521P
Waterbody Type: Lake	Type of TMDL(Point / Nonpoint /Both): Both Point & Non Point Sources
Pollutant(s) addressed: Total Nitrogen (TN)	ESA/EJ Issues: None
Criteria Parameter(s) (magnitude, duration, and frequency): TN = 1.42 mg/L, expressed as an annual in-lake geometric mean concentration.	

Additional National TMDL Tracking System Entry Parameters

TMDL doc ID: 64450	EPA Developed? No	TMDL Target: A 14 percent reduction is required from nonpoint and NPDES stormwater sources in order to meet the TMDL of 1.42 mg/L TN for Deer Lake (WBID 1521P).
303(d) List ID: 1521P	Lead State: Florida	
303(d) List Cycle (Yr): 2002-2009 (Cycle 2)	Pollutant ID: TN	

Description of Waters Addressed By H1 Criteria/TMDL:

Deer Lake is located in the City of Winter Haven, Polk County, Florida. The estimated surface area of the lake is 116 acres, and the watershed encompasses 410 acres. The average depth of the lake is 7.5 ft., with a maximum depth of 17.8 ft. The lake is connected to Lake Cannon by a pipe. Lake Cannon is part of the Winter Haven Southern Chain of Lakes. The Southern Chain of Lakes can discharge to the Wahneta Farms Drainage Canal from a structure on the south side of Lake Lulu. The 2010 Winter Haven Chain of Lakes Water Quality Management Plan indicates anecdotal evidence that shows that the canal has discharged water from the Southern Chain only three times in the past 25 years. The Wahneta Farms Drainage Canal flows into the Peace Creek Drainage Canal, which along with Saddle Creek, makes up the headwaters of the Peace River.

The center of Deer Lake is located at N: 28° 1'33" / W: -81° 45'47". The site specific criteria apply as a spatial average for the lake, as defined by WBID 1521P.

Deer Lake was verified as impaired during the Cycle 2 assessment (the verified period was January 1, 2002, to June 30, 2009) due to excessive nutrients, because the Trophic State Index (TSI) threshold of 60 was exceeded using the methodology in the Identification of Impaired Surface Waters Rule (IWR) (Chapter 62-303, F.A.C.). As a result, the lake was included on the Cycle 2 Verified List of impaired waters for the Sarasota Bay-Peace River-Myakka River Basin that was adopted by Secretarial Order on January 15, 2010.

Based on an analysis of the data from 2002 to 2012 in IWR Database Run 48, the results indicate that Deer Lake would not attain the default lake NNC for chlorophyll a and TN for low color, high alkalinity lakes, and thus remains impaired for nutrients. An analysis of the TP results indicate that the default lake NNC for TP is attained.

Water Quality Standards Decision Document Supporting Rationale and Conclusions

Section 303(c) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 CFR §131 describe the statutory and regulatory requirements for approvable Water Quality Standards. The following information is the minimum requirements for water quality standards submissions and are necessary for EPA to determine if a submitted water quality standard fulfills the legal requirements for approval under §303(c) and EPA regulations.

Use Designations

Requirement: §131.10(a) Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.

Conclusion:

Deer Lake is classified as: Class III Freshwater (recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife).

Protection of Downstream Uses

Requirement: §131.10(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

Conclusion:

Deer Lake is connected to Lake Cannon, which is part of the Winter Haven Chain of Lakes, by a 24 inch pipe that discharges into Lake Cannon when the lake is at higher water levels. Lake Cannon is also hydrologically connected to Lakes Howard, Idylwild, and Mirror via constructed navigable canals and to Lake Blue via a constructed canal and a gated structure that discharges only when seasonal high waters exceed lake operational levels. The TN annual geometric means for all these lakes do not attain the applicable default lake TN NNC for low color, high alkalinity lakes. Lakes Cannon, Howard, Idylwild, Mirror and Blue are part of the Winter Haven Southern Chain of Lakes. Deer Lake is not part of the Winter Haven Chain of Lakes system.

Regression analysis indicates that there is not a significant relationship between the current TN annual geometric means in Deer Lake and Lake Cannon. There is, however, a significant positive relationship between Lake Idylwild and Lake Cannon TN annual geometric means ($r^2 = 0.63$, $p < 0.05$), suggesting between-lake influences in the Winter Haven Chain of Lakes.

An analysis of the Lake Cannon TP results indicate that the default lake NNC for TP is attained, as is the case for Deer Lake.

The reduction in nutrient concentrations prescribed in the TMDL is not expected to cause nutrient impairments downstream and should result in water quality improvements to downstream waters.

Water Quality Criteria

Requirement: §131.11(a) Inclusion of pollutants: (1) States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

Conclusion:

The nitrogen criterion for Deer Lake is the total nitrogen target established in the nutrient TMDL for the Lake. That target is an annual in-lake geometric mean concentration of 1.42 mg/L TN. Rule 62-304.625(15), F.A.C.

Any other criteria applicable to this waterbody, remain in effect, including the nutrient criteria for parameters other than total nitrogen set out in Rule 62-302.531(b), F.A.C.

Scientific Defensibility
<p>Requirement: §131.11(b) Form of criteria: In establishing criteria, States should: (1) Establish numerical values based on: (i) 304(a) Guidance; or (ii) 304(a) Guidance modified to reflect site-specific conditions; or (iii) Other scientifically defensible methods</p> <p>Conclusion:</p> <p>Deer Lake is low color (≤ 40 Platinum Cobalt Units) and high alkalinity (> 20 mg/L CaCO_3), and the default NNC, which are expressed as Annual Geometric Mean (AGM) concentrations not to be exceeded more than once in any three year period, are chlorophyll <i>a</i> of 20 $\mu\text{g/L}$, total nitrogen (TN) of 1.05 mg/L – 1.91 mg/L, and total phosphorus (TP) of 0.03 mg/L – 0.09 mg/L, which are consistent with the requirements of paragraph 62-302.531(2)(b)l., F.A.C.</p> <p>A chlorophyll <i>a</i> value of 20 $\mu\text{g/L}$ was selected as the response variable target for use in establishing the total nitrogen criterion. This target is based on information in the Department's 2012 document titled, <i>Technical Support Document: Development of Numeric Nutrient Criteria for Florida Lakes, Spring Vents and Streams</i>, which demonstrates a chlorophyll <i>a</i> threshold of 20 $\mu\text{g/L}$ is protective of designated uses for low color, high alkalinity lakes.</p> <p>The method utilized to address the nutrient impairment is a regression equation that relates the lake TN concentrations to the annual geometric mean chlorophyll <i>a</i> levels. The criterion is expressed as an annual geometric mean concentration not to be exceeded in any year. Establishing the frequency as not to be exceeded in any year ensures that the chlorophyll <i>a</i> NNC, which is protective of the designated use, is achieved. The water quality results applied in the analysis spanned the 1999 - 2012 period, which included both wet and dry years. The annual average rainfall for 1999-2012 was 48.2 inches/year. The years 2000, 2006, and 2007 were dry years, 2009 to 2011 were average years, and 2002, 2004, and 2005 were wet years.</p> <p>The EPA determined that the selection of a chlorophyll <i>a</i> value of 20 $\mu\text{g/L}$ as the response variable target is appropriate and the linear regression method used by the State to determine a total nitrogen value that corresponds to the response variable target, is an appropriate and defensible method addressed by this approval action. This approach is further supported by the above-cited document, provided by the State.</p>
Public Participation
<p>Requirement: §131.20(b) Public participation. The State shall hold a public hearing for the purpose of reviewing water quality standards, in accordance with provisions of State law, in accordance with State law and EPA's public participation regulation (40 CFR part 25). The proposed water quality standards revision and supporting analyses shall be made available to the public prior to the hearing.</p> <p>Conclusion:</p> <p>A public workshop was conducted by the Department on March 26, 2014 in Bartow, Florida to obtain comments on the draft nutrient TMDLs for four lakes in the Peace River Basin, including Deer Lake. The workshop notice indicated that these nutrient TMDLs, if adopted, constitute site specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(47)(b), F.A.C., that would replace the otherwise applicable numeric nutrient criteria in subsection 62-302.531(2) for these particular waters, upon paragraph 62-302.531(2)(a), F.A.C., becoming effective.</p>
Certification by the State Attorney General
<p>Requirement: §131.6(e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.</p> <p>Conclusion:</p> <p>Letter from FDEP General Counsel, Craig Varn, dated June 30, 2015 certified that the Deer Lake TMDL was duly adopted as water quality standard pursuant to state law.</p>

Endangered Species Section 7 Consultation

Requirement: §7(a)(2) of the Endangered Species Act requires federal agencies, in consultation with the Services to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species.

Conclusion:

A programmatic letter of concurrence between U.S. EPA and U.S. FWS, dated July 21, 2015, serves as completion of the Endangered Species Act Section 7 consultation for this action.

Final Recommendation/Conclusion

Based on the chemical, physical and biological data presented in the development of the H1 NNC outlined above, the EPA concludes that all of the aforementioned H1 NNC provide for and protect healthy, well-balanced, biological communities in the waters to which the NNC apply and are consistent with the CWA and its implementing regulations. More specifically, the NNC are consistent with both 40 CFR 131.11(b)(1)(ii), and the EPA's 304(a) guidance on nutrient criteria. In accordance with section 303(c) of the CWA, the H1 NNC addressed by this decision document is/are hereby approved as consistent with the CWA and 40 CFR part 131. Therefore, the revised nutrient criterion for Deer Lake is TN = 1.42 mg/L, expressed as an annual geometric mean in-lake concentration. The TMDL document also provides that the geometric mean is not be exceeded in any year. All other criteria applicable to this waterbody remain in effect, including other applicable criteria at 62-302.531(2)(b) [or(c)] . The requirements of paragraph 62-302.530(47)(a), F.A.C. also remain applicable.

TMDL Review Checklist Supporting Rationale and Comments

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 CFR §130 describe the statutory and regulatory requirements for approvable TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under §303(d) and EPA regulations. When the information listed below uses the verb "**must**" or "**require**," this denotes information that is needed by EPA to review elements of the TMDL required by the CWA and by regulation.

Submittal Letter

Considerations:

- Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under §303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute.

Conclusions:

Accompanying the State's (March 2015) final TMDL for nutrients is a submittal letter dated June 30, 2015 from Craig Varn General Counsel, FDEP which states, "The Florida Department of Environmental Protection ("DEP") is submitting the enclosed nutrient TMDLs ("TMDLs") to the Environmental Protection Agency for review and approval in accordance with Sections 303(c) and 303(d) of the Clean Water Act. The submitted nutrient TMDLs are for Lake Bonny, Lake Hollingsworth, Lake Lena, and Deer Lake, and have been adopted in Rules 62-304.625(13)-(16), Florida Administrative Code ("F.A.C."). Under paragraph 62-302.531 (2)(a), F.A.C., these TMDLs were established as site specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(47)(b), F.A.C. Thus, the submittal letter clearly establishes the Agency's duty to review the State's nutrients TMDLs submittal under 303(d) of the Clean Water Act. DEP submitted a revised Final TMDL document (December 2015) on December 7, 2015 which EPA is acting on in this Decision Document.

Scope of TMDL

Considerations:

- The TMDL should describe the waterbody as it is identified on the State/Tribe's §303(d) list, the pollutant(s) of concern, and the applicable water quality criteria that led to impairment listing. The waters addressed by the TMDL must be identified and consistent with the 303(d) list.
- The TMDL should include a statistical evaluation of all readily available data that was used to place the waterbody on the 303(d) list.
- The TMDL submittal must include a description of the point, nonpoint, and natural background (where possible) sources of the pollutant of concern. Such information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation. The TMDL submittal should also contain a description of any important factors, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation, as applicable; and (3) present and future growth trends, if this is a factor that was taken into consideration in preparing the TMDL.

Conclusions:

The TMDL report addresses a Section 303(d) listed waterbody.

The IWR requires the State to "assemble and evaluate" data in order to prepare for the development of the State's section 303(d) list. Florida has an extensive monitoring network and a robust data collection that is managed and compiled into Florida's IWR database. This database is used to determine if waterbodies are meeting their designated use and if a TMDL is needed. All data presented in this report are from IWR Run 48.

The TMDL report describes the source categories, subcategories, or individual sources of nutrients in the watershed. The wasteload allocation and the load allocation are displayed in Table 6.1. Within the TMDL report, the pertinent background information is included in the text, tables and figures. Chapter 4 of the TMDL report discusses the source assessment for the waterbodies. Section 4.2 discusses the point sources in the watershed. Section 4.2.2 discusses the MS4 permittees in the watershed. Section 4.3 discusses the Land Uses and Nonpoint sources of nutrients. Table 4.1 reports the land use categories in the watershed. "The predominant land use in the lake's drainage area is urban development, making up 62 percent of the watershed area. Medium density residential is the largest urban use type covering 31 percent of the basin. Other common urban land uses include commercial and services (9 percent), high density residential (8 percent), and institutional (6 percent). Agricultural land (tree crops) occupy about 5 percent of the land area.

Most of the area near the lake consists of urban land, primarily medium and high density residential areas, as well as a commercial area along Avenue G NW on the north side of the lake. Greater than 50 percent of the lake shoreline is directly adjacent to residential development. The watershed includes tree crops of approximately 19 acres that is located in the southwest portion of the basin near the lake shore. Also along the southwest shoreline of the lake is natural land, comprised of forest and wetlands, which covers 22 acres.

Loading Capacity

Considerations:

- EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards [40 CFR §130.2(f)]. The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure [40 CFR § 130.2(i)]. **The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant. To the degree it is known, it should also describe the cause and effect relationship between the identified pollutant sources, the numeric target (narrative target if appropriate), and achievement of water quality standards.**
- **Supporting documentation for the TMDL analysis must also be contained in the submittal. This should include a description of the analytical process used, results from water quality modeling, assumptions, etc.** The TMDL submittal should also contain a description of other important factors, such as an explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable.
- **Critical conditions must be considered as part of the analysis of loading capacity [40 CFR § 130.7(c)(1)].** Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that result in attaining and maintaining the water quality criterion and have an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.

Conclusions:

The linkage between water quality and pollutant sources can be found in Chapters 3 and 5 of the TMDL report.

3.2 Numeric Interpretation of Narrative Nutrient Criterion

The development of the lake NNC are based on an evaluation of a response variable (chlorophyll a) and stressor variables (nitrogen and phosphorus) to develop water quality thresholds that are protective of designated uses (Florida DEP, 2012). Based on several lines of evidence, the DEP developed a chlorophyll a threshold of 20 µg/L for colored lakes (above 40 PCU) and clear lakes with alkalinity above 20 mg/L CaCO₃. Since the Department has demonstrated that the chlorophyll a threshold of 20 µg/L is protective of designated uses, this value will be used as a water quality target for TMDL development to address the nutrient impairment of Deer Lake. Empirical equations that describe the relationships between chlorophyll a and nutrient concentrations in Deer Lake were then used in the TMDL development approach, which is explained in detail in Chapter 5 of the TMDL report.

5.1 Determination of Loading Capacity

The TMDL development process identifies nutrient target concentrations and nutrient reductions for Deer Lake in order for the waterbody to achieve the applicable nutrient water quality criteria, and maintain its function and designated use as a Class III fresh water. The methods utilized to address the nutrient impairment included the

development of regression equations that relate lake nutrient concentrations to the annual geometric mean chlorophyll *a* levels. For addressing nonpoint sources (both NPDES stormwater discharges and non-NPDES stormwater discharges), the TMDLs are expressed as percent reductions in the existing lake water total nitrogen concentrations necessary to meet the applicable chlorophyll *a* target

The primary focus in the implementation of this TMDL is to maintain the lake's annual geometric mean chlorophyll *a* values at or below the target concentration of 20 µg/L through reductions in nutrient inputs to the system. Nutrient reductions are also expected to result in improvements of dissolved oxygen levels within the lake. When algae die they become part of the organic matter pool in the water column and the sediments. The decomposition of organic substrates by microbial activity exerts an oxygen demand which leads to a lowering of dissolved oxygen levels. Lower algal biomass should lower the biochemical oxygen demand levels in the water column, and sediment oxygen demand in the lake should also decrease over time as reductions in algal biomass will result in less accumulation of organic matter in the lake sediments.

The TMDL Development Process

The method used for developing the nutrient TMDLs is a percent reduction approach, whereby the percent reductions in the existing lake TN concentration was calculated to meet the nutrient water quality targets. As discussed in Chapter 3 of the TMDL report, the NNC chlorophyll *a* threshold of 20 µg/L, expressed as an annual geometric mean, was selected as the response variable target for TMDL development. To identify the TN water quality target, the regression equation explaining the relationship between annual geometric mean chlorophyll *a* and TN, **Figure 5.5 of the TMDL report**, was used to determine the TN concentration necessary to meet the chlorophyll *a* target of 20 µg/L. An annual TN geometric mean of 1.42 mg/L results in a chlorophyll *a* annual geometric mean of 20 µg/L.

Based on an assessment of the lake results as presented in Table 2.1 of the TMDL report, the TP annual geometric means did not exceed the applicable NNC of 0.03 mg/L in any year. The available data indicate that the lake TP results are meeting the applicable NNC. Additionally, there is not an evident relationship between chlorophyll *a* and TP annual geometric mean concentrations, (see Figure 5.6 of the TMDL report), suggesting that the existing TP condition is not a significant contributor to lake eutrophication. The available information indicates that the existing lake phosphorus concentrations and TP loads to the lake are not having a detrimental effect on surface water quality, so there is not a need to develop a TMDL for TP. Although a TP TMDL is not necessary, the lake TP concentrations should be maintained at existing conditions to ensure that the applicable NNC continues to be attained.

Deer Lake is expected to meet the applicable nutrient criteria and maintain its function and designated use as a Class III water when surface water TN concentrations are reduced to the target concentration, which will address the anthropogenic contributions to the water quality impairment. The approach used to establish the nutrient target and the TMDL, addresses meeting the chlorophyll *a* target, which is protective of the lake's designated use.

The existing lake nutrient conditions evaluated for establishing the TMDL, were the TN concentrations measured in the 2002-2012 period. This time frame includes the entire Cycle 2 verified period (January 2002 to June 2009). The geometric means were calculated from TN results available in IWR Database Run 48. For the purpose of establishing the TMDL, the existing TN condition used in the percent reduction calculation is the maximum TN annual geometric mean value in the 2002-2012 time frame. The highest geometric mean value, 1.62 mg/L, occurred in 2012, (see Table 5.2 of the TMDL report). A measure of central tendency (median or mean values) is frequently used to represent the existing water quality conditions for TMDL development. However, this approach was not used for the Deer Lake TMDL because, for this lake, the TN and chlorophyll *a* targets were met in 2005, 2006, and 2011. Using the median value of annual geometric means of all years is not as stringent as using the maximum annual geometric mean to set the existing condition for calculating the needed reduction. Therefore the maximum annual geometric mean value was used to represent the existing condition, to exclude consideration of the years when the TN target was met. The use of the maximum geometric mean value in setting the TMDL is considered a conservative assumption for establishing reductions as this will ensure that all exceedances of the TN target are addressed, as well as adds to the margin of safety of the TMDL.

The equation used to calculate the percent reduction is as follows:

$$\frac{[\text{measured exceedance} - \text{target}]}{\text{measured exceedance}} \times 100$$

The measured exceedance is the maximum TN annual geometric mean value. For the maximum TN value of 1.62 mg/L to achieve the target concentration of 1.42 mg/L, a 12 percent reduction in the lake TN concentration is necessary. The nutrient TMDL value, which is expressed as an annual geometric mean, addresses the anthropogenic nutrient inputs which contribute to the exceedances of the chlorophyll *a* restoration target.

Chapter 5.4 of the TMDL report also discusses critical conditions.

"The estimated assimilative capacity is based on annual conditions, rather than critical/seasonal conditions because (a) the methodology used to determine the assimilative capacity does not lend itself very well to short-term assessments, (b) the Department is generally more concerned with the net change in overall primary productivity in the segment, which is better addressed on an annual basis, and (c) the methodology used to determine impairment is based on annual conditions (annual geometric means or arithmetic means).

Wasteload Allocations (WLAs)

Considerations:

- EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources [40 CFR §130.2(h)].
- Wasteload allocations must be assigned to each point source discharging the pollutant of concern [40 CFR 130.2(i)]. WLAs can be expressed as lumped or aggregate allocations if appropriate.
- If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero.
- The wasteload allocations should be sufficient, in consideration of nonpoint source loads, to ensure that the point sources will not cause or contribute to excursions of water quality standards [40 CFR §122.44(d)(1)].

Conclusions:

Polk County and Co- Permittees (FDOT District 1 and the City of Winter Haven) are covered by a Phase I NPDES municipal separate storm sewer system (MS4) permit (FLS000015) and areas within their jurisdiction in the Deer Lake watershed may be responsible for a 12 percent total nitrogen reduction in current anthropogenic loading. It should be noted that any MS4 permittee is only responsible for reducing the anthropogenic loads associated with stormwater outfalls that it owns or otherwise has responsible control over, and it is not responsible for reducing other nonpoint source loads in its jurisdiction.

"As noted in Chapter 4, Section 4.2.1 of the TMDL report, there are no active NPDES-permitted wastewater facilities that discharge surface water within the watershed. Therefore, the WLA_{wastewater} for the Deer Lake TMDL is "not applicable" because there are no wastewater or industrial wastewater NPDES facilities that discharge directly to Deer Lake."

Load Allocations (LAs)

Considerations:

- EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background [40 CFR §130.2(g)]. Load allocations may range from reasonably accurate estimates to gross allotments [40 CFR §130.2(g)]. Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources.
- If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero.

Conclusions:

The nonpoint sources received LAs to meet the TMDL.

A 12 percent reduction is required from nonpoint sources in order to meet the TMDL of 1.42 mg/L annual geometric mean TN for Deer Lake

"It should be noted that the load allocation includes loading from stormwater discharges that are not part of the NPDES Stormwater Program"

	Margin of Safety (MOS)
<p>Considerations:</p> <ul style="list-style-type: none"> The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality [CWA §303(d)(1)(C), 40 CFR § 130.7(c)(1)]. EPA guidance explains that the MOS may be implicit, i.e. incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e. expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified. 	
<p>Conclusions:</p> <p>An implicit margin of safety was used for this TMDL. For additional information pertaining to the MOS, please refer to Section 6.4 of the TMDL report.</p> <p>An implicit margin of safety (MOS) was used in the development of these TMDLs because of the conservative assumptions that were applied. The TMDL was developed using the highest TN annual geometric mean value to calculate the percent reduction.</p>	
	Seasonal Variation
<p>Considerations:</p> <ul style="list-style-type: none"> The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for considering seasonal variations in the TMDL must be described [CWA §303(d)(1)(C), 40 CFR §130.7(c)(1)]. 	
<p>Conclusions:</p> <p>The estimated assimilative capacity is based on annual conditions, rather than critical/seasonal conditions because (a) the methodology used to determine the assimilative capacity does not lend itself very well to short-term assessments, (b) the Department is generally more concerned with the net change in overall primary productivity in the segment, which is better addressed on an annual basis, and (c) the methodology used to determine impairment is based on annual conditions (annual geometric means or arithmetic means).</p>	
	Public Participation
<p>Considerations:</p> <ul style="list-style-type: none"> EPA regulations require public review [40 CFR §130.7(c)(1)(ii), 40 CFR §25] consistent with State or Tribe's own continuing planning process and public participation requirements. In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments. 	
<p>Conclusions:</p> <p>The State's public participation process is consistent with regulations.</p>	
	Other Considerations
<p>Considerations:</p> <ul style="list-style-type: none"> This section may be needed in the TMDL review in order to describe unique factors or information specific to the TMDL under review, which help explain the basis for EPA's decision. 	
<p>Conclusions:</p> <p>N/A</p>	

Final Recommendation/Comments

Deer Lake is expected to meet the applicable nutrient criteria and maintain its function and designated use as a Class III water when surface water TN concentrations are reduced to the target concentration, which will address the anthropogenic contributions to the water quality impairment. The approach used to establish the nutrient target and the TMDL, addresses meeting the chlorophyll *a* target, which is protective of the lake's designated use.

The TMDL presented in this decision document will constitute the site specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.), that will replace the otherwise applicable numeric nutrient criteria (NNC) in subsection 62-302.531(2) for this particular water, pursuant to paragraph 62-302.531(2)(a), F.A.C..

The Water Quality Planning Branch recommends that the TMDL be **APPROVED**.

Date: _____

3/22/16



James D. Giattina
Director, Water Management Division

Florida Numeric Interpretation of the Narrative Nutrient Water Quality Criteria through a TMDL to establish a Hierarchy 1 (H1): Joint Water Quality Standards and TMDL Decision Document

Summary Waterbody Information

TMDL Document Name: Nutrient TMDL Report for Lake Lena (WBID 1501)	County: Polk County, FL
Reviewer(s): Laila Hudda, Simona Platukyte	Date of Submittal: June 30, 2015, December 7, 2015 (revised)
Use Classification: Class III Freshwater	WBID/HUC: 1501
Waterbody Type: Lake	Type of TMDL(Point / Nonpoint /Both): Both
Pollutant(s) addressed: Total Nitrogen (TN)	ESA/EJ Issues? No ESA issues; EJ -None
Criteria Parameter(s) (magnitude, duration, and frequency): TN = 1.14 mg/L, expressed as an annual geometric mean lake concentration.	

Additional National TMDL Tracking System Entry Parameters

TMDL doc ID: 64449	EPA Developed? No	TMDL Target:
303(d) List ID: 1501	Lead State: Florida	A 42 percent reduction is required from nonpoint and NPDES stormwater sources in order to meet the TMDL of 1.14 mg/L TN for Lake Lena (WBID 1501).
303(d) List Cycle (Yr): 1997-2004(Cycle 1), 2002-2009 (Cycle 2)	Pollutant ID: TN	

Description of Waters Addressed By H1 Criteria/TMDL:

Lake Lena is located inside the City of Auburndale, Polk County, Florida. The surface area of the lake is 207 acres, and the watershed encompasses 5,446 acres. The average depth of the lake is 10 ft, with a maximum depth of 14 ft. The lake outlet is connected to Lake Lena Run, which flows into Lake Hancock. Lake Hancock discharges to lower Saddle Creek, which along with the Peace Creek Drainage Canal, makes up the headwaters of the Peace River.

The center of Lake Lena is located at N: 28° 3'57", W: -81° 48'33". The site specific criteria apply as a spatial average for the lake, as defined by WBID 1501.

Lake Lena was initially verified as impaired during the Cycle 1 assessment (the verified period was January 1, 1997, to June 30, 2004) due to excessive nutrients, because the Trophic State Index (TSI) threshold of 60 was exceeded using the methodology in the Identification of Impaired Surface Waters Rule (IWR) (Chapter 62-303, F.A.C.). As a result, the lake was included on the Cycle 1 Verified List of impaired waters for the Sarasota Bay-Peace River-Myakka River Basin that was adopted by Secretarial Order on June 17, 2005. During the Cycle 2 assessment (verified period of January 1, 2002, to June 30, 2009), the impairment for nutrients was documented as continuing, as the TSI threshold of 60 was exceeded.

Based on an analysis of the data from 2002 to 2012 in IWR Database Run 48, the results indicate that Lake Lena would not attain the default lake NNC for chlorophyll *a* and TN for low color, high alkalinity lakes, and thus remains impaired for nutrients. An analysis of the TP results indicate that the default lake NNC for TP is attained.

**Water Quality Standards Decision Document
Supporting Rationale and Conclusions**

Section 303(c) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 CFR §131 describe the statutory and regulatory requirements for approvable Water Quality Standards. The following information is the minimum requirements for water quality standards submissions and are necessary for EPA to determine if a submitted water quality standard fulfills the legal requirements for approval under §303(c) and EPA regulations.

Use Designations

Requirement: §131.10(a) Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States.

Conclusion:

Lake Lena is classified as: Class III Freshwater (recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife).

Protection of Downstream Uses

Requirement: §131.10(b) In designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters.

Conclusion:

Lake Lena Run is the nearest downstream water to Lake Lena.

The Lake Lena TN concentration target of 1.14 mg/L is less than the West Central Nutrient Watershed Region threshold of 1.65 mg/L for TN that is applicable to Lake Lena Run. The West Central Nutrient Watershed Region TN stream threshold, expressed as an annual geometric mean, may be exceeded once in a three year period and is higher than the annual geometric mean lake TMDL nutrient target. Since the TMDL nutrient target is lower than the stream nutrient threshold for the area and is expressed as a frequency of "not to be exceeded in any year" the TMDL target is assumed to be protective of the applicable stream threshold.

The nutrient concentration reduction prescribed in the TMDL is not expected to cause nutrient impairments downstream and should result in water quality improvements to downstream water, Lake Lena Run.

Water Quality Criteria

Requirement: §131.11(a) Inclusion of pollutants: (1) States must adopt those water quality criteria that protect the designated use. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. For waters with multiple use designations, the criteria shall support the most sensitive use.

Conclusion:

The nitrogen criterion for Lake Lena is the total nitrogen target established in the nutrient TMDL for the Lake. That target is an annual in-lake geometric mean concentration of 1.14 mg/L TN. Rule 62-304.625(15), F.A.C.

Any other criteria applicable to this waterbody, remain in effect, including the nutrient criteria for parameters other than total nitrogen set out in Rule 62-302.531(b), F.A.C.

Scientific Defensibility

Requirement: §131.11(b) Form of criteria: In establishing criteria, States should: (1) Establish numerical values based on:

(i) 304(a) Guidance; or (ii) 304(a) Guidance modified to reflect site-specific conditions; or (iii) Other scientifically defensible methods

Conclusion:

Lake Lena is low color (≤ 40 Platinum Cobalt Units) and high alkalinity (> 20 mg/L CaCO_3) and the default NNC, which are expressed as Annual Geometric Mean (AGM) concentrations not to be exceeded more than once in any three year period, are Chlorophyll a of 20 $\mu\text{g/L}$, total nitrogen (TN) of 1.05 mg/L – 1.91 mg/L, and total phosphorus (TP) of 0.03 mg/L – 0.09 mg/L, which are consistent with the requirements of paragraph 62-302.531(2)(b)I., F.A.C.

A chlorophyll a value of 20 $\mu\text{g/L}$ was selected as the response variable target for use in establishing the nutrient TMDLs. This target is based on information in the Department's 2012 document titled, *Technical Support Document: Development of Numeric Nutrient Criteria for Florida Lakes, Spring Vents and Streams*, which demonstrates a chlorophyll a threshold of 20 $\mu\text{g/L}$ is protective of designated uses for low color, high alkalinity lakes. FDEP's site specific criterion for total nitrogen (TN) approved by this action is: TN = 1.14 mg/L, expressed as an annual geometric mean lake concentration not to be exceeded in any year. Establishing the frequency as not to be exceeded in any year ensures that the chlorophyll a NNC, which is protective of the designated use, is achieved.

The method utilized to address the nutrient impairment is a regression equation that relates the lake TN concentrations to the annual geometric mean chlorophyll a levels. The empirical model was developed using water quality monitoring data from the 1999-2012 period. The primary dataset for this period is the IWR Run 48 database. The water quality results applied in the analysis spanned the 1999 - 2012 period, which included both wet and dry years. The annual average rainfall for 1999-2012 was 48.2 inches/year. The years 2000, 2006, and 2007 were dry years, 2009 to 2011 were average years, and 2002, 2004, and 2005 were wet years.

The EPA determined that the selection of a chlorophyll a value of 20 $\mu\text{g/L}$ as the response variable target is appropriate and the linear regression method used by the State to determine a total nitrogen value that corresponds to the response variable target, is an appropriate and defensible method addressed by this approval action. This approach is further supported by the above-cited document, provided by the State.

Public Participation

Requirement: §131.20(b) Public participation. The State shall hold a public hearing for the purpose of reviewing water quality standards, in accordance with provisions of State law, in accordance with State law and EPA's public participation regulation (40 CFR part 25). The proposed water quality standards revision and supporting analyses shall be made available to the public prior to the hearing.

Conclusion:

A public workshop was conducted by the Department on March 26, 2014 in Bartow, Florida to obtain comments on the draft nutrient TMDLs for four lakes in the Peace River Basin, including Lake Lena. The workshop notice indicated that these nutrient targets established in the TMDL, if adopted, constitute site specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(47)(b), F.A.C., that would replace the otherwise applicable numeric nutrient criteria in subsection 62-302.531(2) for these particular waters, upon paragraph 62-302.531(2)(a), F.A.C., becoming effective.

Certification by the State Attorney General

Requirement: §131.6(e) Certification by the State Attorney General or other appropriate legal authority within the State that the water quality standards were duly adopted pursuant to State law.

Conclusion:

Letter from FDEP General Counsel, Craig Varn, dated June 30, 2015 certified that the Lake Lena TMDL was duly adopted as water quality standard pursuant to state law.

Endangered Species Section 7 Consultation
<p>Requirement: §7(a)(2) of the Endangered Species Act requires federal agencies, in consultation with the Services to ensure that their actions are not likely to jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of designated critical habitat of such species.</p>
<p>Conclusion:</p> <p>A programmatic letter of concurrence between U.S. EPA and U.S. FWS, dated July 21, 2015, serves as completion of the Endangered Species Act Section 7 consultation for this action.</p>
Final Recommendation/Conclusion
<p>Based on the chemical, physical and biological data presented in the development of the H1 NNC outlined above, the EPA concludes that all of the aforementioned H1 NNC provide for and protect healthy, well-balanced, biological communities in the waters to which the NNC apply and are consistent with the CWA and its implementing regulations. More specifically, the NNC are consistent with both 40 CFR 131.11(b)(1)(ii), and the EPA's 304(a) guidance on nutrient criteria. In accordance with section 303(c) of the CWA, the H1 NNC addressed by this decision document is/are hereby approved as consistent with the CWA and 40 CFR part 131. Therefore, the revised nutrient criterion for Lake Lena is TN = 1.14 mg/L, expressed as an annual geometric mean in-lake concentration. The TMDL document also provides that the geometric mean is not be exceeded in any year. All other criteria applicable to this waterbody remain in effect, including other applicable criteria at 62-302.531(2)(b) [or(c)]. The requirements of paragraph 62-302.530(47)(a), F.A.C. also remain applicable.</p>

TMDL Review Checklist Supporting Rationale and Comments

Section 303(d) of the Clean Water Act (CWA) and EPA's implementing regulations at 40 CFR §130 describe the statutory and regulatory requirements for approvable TMDLs. The following information is generally necessary for EPA to determine if a submitted TMDL fulfills the legal requirements for approval under §303(d) and EPA regulations. When the information listed below uses the verb "**must**" or "**require**," this denotes information that is needed by EPA to review elements of the TMDL required by the CWA and by regulation.

Submittal Letter

Considerations:

- Each final TMDL submitted to EPA should be accompanied by a submittal letter that explicitly states that the submittal is a final TMDL submitted under §303(d) of the Clean Water Act for EPA review and approval. This clearly establishes the State/Tribe's intent to submit, and EPA's duty to review, the TMDL under the statute.

Conclusions:

Accompanying the State's (March 2015) final TMDL for nutrients is a submittal letter dated June 30, 2015 from Craig Varn General Counsel, FDEP which states, "The Florida Department of Environmental Protection ("DEP") is submitting the enclosed nutrient TMDLs ("TMDLs") to the Environmental Protection Agency for review and approval in accordance with Sections 303(c) and 303(d) of the Clean Water Act. The submitted nutrient TMDLs are for Lake Bonny, Lake Hollingsworth, Lake Lena, and Deer Lake, and have been adopted in Rules 62-304.625(13)-(16), Florida Administrative Code ("F.A.C."). Under paragraph 62-302.531 (2)(a), F.A.C., these TMDLs were established as site specific numeric interpretations of the narrative nutrient criterion set forth in paragraph 62-302.530(47)(b), F.A.C. Thus, the submittal letter clearly establishes the Agency's duty to review the State's nutrients TMDLs submittal under 303(d) of the Clean Water Act. FDEP submitted a revised Final TMDL document (December 2015) on December 7, 2015 which EPA is acting on in this Decision Document.

Scope of TMDL

Considerations:

- The TMDL should describe the waterbody as it is identified on the State/Tribe's §303(d) list, the pollutant(s) of concern, and the applicable water quality criteria that led to impairment listing. The waters addressed by the TMDL must be identified and consistent with the 303(d) list.
- The TMDL should include a statistical evaluation of all readily available data that was used to place the waterbody on the 303(d) list.
- The TMDL submittal must include a description of the point, nonpoint, and natural background (where possible) sources of the pollutant of concern. Such information is necessary for EPA's review of the load and wasteload allocations, which are required by regulation. The TMDL submittal should also contain a description of any important factors, such as: (1) the assumed distribution of land use in the watershed; (2) population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation, as applicable; and (3) present and future growth trends, if this is a factor that was taken into consideration in preparing the TMDL.

Conclusions:

The TMDL report addresses a Section 303(d) listed waterbody.

The IWR requires the State to "assemble and evaluate" data in order to prepare for the development of the State's section 303(d) list. Florida has an extensive monitoring network and a robust data collection that is managed and compiled into Florida's IWR database. This database is used to determine if waterbodies are meeting their designated use and if a TMDL is needed. All data presented in this report are from IWR Run 48.

The TMDL report describes the source categories, subcategories, or individual sources of nutrients in the watershed. The wasteload allocation and the load allocation are displayed in Table 6.1 of the TMDL report. Within the TMDL report, the pertinent background information is included in the text, tables and figures. Chapter 4 of the TMDL report discusses the source assessment for the waterbodies. Section 4.2 discusses the point sources in the watershed. Section 4.2.2 discusses the MS4 permittees in the watershed. Section 4.3 discusses the Land Uses and Nonpoint sources of nutrients. Table 4.1 of the TMDL report describes the land use categories in the watershed as follows: "Land use is predominately urban, with approximately 27 percent of the land area developed into medium density residential areas. Surface waters cover 38 percent of the watershed area. The largest waterbodies in the watershed include Lakes Ariana, Arietta, and Whistler, all of which are located upstream of Lake Lena. Agricultural land, primarily located in the northern area, includes tree crops, cropland and pastureland, and encompasses 16 percent of the watershed area. Wetlands cover almost 3 percent of the watershed."

Loading Capacity**Considerations:**

- EPA regulations define loading capacity as the greatest amount of loading that a water can receive without violating water quality standards [40 CFR §130.2(f)]. The loadings are required to be expressed as either mass-per-time, toxicity or other appropriate measure [40 CFR § 130.2(i)]. **The TMDL submittal must identify the waterbody's loading capacity for the applicable pollutant. To the degree it is known, it should also describe the cause and effect relationship between the identified pollutant sources, the numeric target (narrative target if appropriate), and achievement of water quality standards.**
- **Supporting documentation for the TMDL analysis must also be contained in the submittal. This should include a description of the analytical process used, results from water quality modeling, assumptions, etc.** The TMDL submittal should also contain a description of other important factors, such as an explanation and analytical basis for expressing the TMDL through surrogate measures, if applicable.
- **Critical conditions must be considered as part of the analysis of loading capacity [40 CFR § 130.7(c)(1)].** Critical conditions are the combination of environmental factors (e.g., flow, temperature, etc.) that result in attaining and maintaining the water quality criterion and have an acceptably low frequency of occurrence. Critical conditions are important because they describe the factors that combine to cause a violation of water quality standards and will help in identifying the actions that may have to be undertaken to meet water quality standards.

Conclusions:

The linkage between water quality and pollutant sources can be found in Chapters 3 and 5 of the TMDL report.

3.2 Numeric Interpretation of Narrative Nutrient Criterion

The development of the lake NNC are based on an evaluation of a response variable (chlorophyll *a*) and stressor variables (nitrogen and phosphorus) to develop water quality thresholds that are protective of designated uses (Florida DEP, 2012). Based on several lines of evidence, the DEP developed a chlorophyll *a* threshold of 20 µg/L for colored lakes (above 40 PCU) and clear lakes with alkalinity above 20 mg/L CaCO₃. Since the Department has demonstrated that the chlorophyll *a* threshold of 20 µg/L is protective of designated uses, this value will be used as a water quality target for TMDL development to address the nutrient impairment of Lake Lena. Empirical equations that describe the relationships between chlorophyll *a* and nutrient concentrations in Lake Lena were then used in the TMDL development approach, which is explained in detail in Chapter 5 of the TMDL report.

5.1 Determination of Loading Capacity

The TMDL development process identifies nutrient target concentrations and nutrient reductions for Lake Lena in order for the waterbody to achieve the applicable nutrient water quality criteria, and maintain its function and designated use as a Class III fresh water. The methods utilized to address the nutrient impairment included the development of regression equations that relate lake nutrient concentrations to the annual geometric mean chlorophyll *a* levels. For addressing nonpoint sources (both NPDES stormwater discharges and non-NPDES stormwater discharges), the TMDLs are expressed as percent reductions in the existing lake water total nitrogen concentrations necessary to meet the applicable chlorophyll *a* target

The primary focus in the implementation of this TMDL is to maintain the lake's annual geometric mean chlorophyll *a* values at or below the target concentration of 20 µg/L through reductions in nutrient inputs to the system. Nutrient reductions are also expected to result in improvements of dissolved oxygen levels within the lake. When algae die they become part of the organic matter pool in the water column and the sediments. The decomposition of organic substrates by microbial activity exerts an oxygen demand which leads to a lowering of dissolved oxygen levels. Lower algal biomass should lower the biochemical oxygen demand levels in the water column, and sediment oxygen demand in the lake should also decrease over time as reductions in algal biomass will result in less accumulation of organic matter in the lake sediments.

The TMDL Development Process

The method used for developing the nutrient TMDLs is a percent reduction approach, whereby the percent reductions in the existing lake TN concentration was calculated to meet the nutrient water quality targets. As discussed in Chapter 3 of the TMDL report, the NNC chlorophyll *a* threshold of 20 µg/L, expressed as an annual geometric mean, was selected as the response variable target for TMDL development. To identify the TN water quality target, the regression equation explaining the relationship between annual geometric mean chlorophyll *a* and TN, (see Figure 5.6 of the TMDL report), was used to determine the TN concentration necessary to meet the chlorophyll *a* target of 20 µg/L. An annual TN geometric mean of 1.14 mg/L results in a chlorophyll *a* annual geometric mean of 20 µg/L.

Based on an assessment of the lake results as presented in Table 2.1 of the TMDL report, the TP annual geometric means did not exceed the applicable NNC of 0.03 mg/L more than once in any consecutive three year period. The majority of the geometric means are 0.03 mg/L. The available data indicate that the lake TP results are meeting the applicable NNC. Additionally, the relationship between chlorophyll *a* and TP annual geometric mean concentrations is not strong, (see Figure 5.7 of the TMDL report), suggesting that the existing TP condition is not a significant contributor to lake eutrophication. The available information indicates that the existing lake phosphorus concentrations and TP loads to the lake are not having a detrimental effect on surface water quality, so there is not a need to develop a TMDL for TP. Although a TP TMDL is not necessary, the lake TP concentrations should be maintained at existing conditions to ensure that the applicable NNC continues to be attained.

Lake Lena is expected to meet the applicable nutrient criteria and maintain its function and designated use as a Class III water when surface water TN concentrations are reduced to the target concentrations, which will address the anthropogenic contributions to the water quality impairment. The approaches used to establish the nutrient targets, address meeting the chlorophyll *a* target, which is protective of the lake's designated use.

The existing lake nutrient conditions used in establishing the TMDLs were the TN concentrations measured in the 2002-2012 period. This time frame includes the entire Cycle 2 verified period (January 2002 to June 2009). For the purpose of establishing the TMDL, the existing TN condition used in the percent reduction calculation is the maximum TN annual geometric mean value in the 2002-2012 time frame. The geometric means were calculated from nutrient results available in IWR Database Run 48. The highest geometric mean value, 1.98 mg/L, occurred in 2009, (Table 5.2 of the TMDL report). A measure of central tendency (median or mean values) is frequently used to represent the existing water quality conditions for TMDL development. However, this approach was not used for the

Lake Lena TMDL because, for this lake, the TN and chlorophyll *a* targets were met in 2005. Using the median value of the annual geometric mean of all years is not as stringent as using the maximum annual geometric mean to set the existing condition for calculating the needed reduction. Therefore the maximum annual geometric mean value was used to represent the existing condition, to exclude consideration of the year when the TN target was met. The use of the maximum geometric mean value in setting the TMDL is considered a conservative assumption for establishing reductions as this will ensure that all exceedances of the TN target are addressed, as well as adds to the margin of safety of the TMDL.

The equation used to calculate the percent reduction is as follows:

$$\frac{[\text{measured exceedance} - \text{target}]}{\text{measured exceedance}} \times 100$$

The measured exceedance is the maximum TN annual geometric mean value. For the maximum TN value of 1.98 mg/L to achieve the target concentration of 1.14 mg/L, a 42 percent reduction in the lake TN concentration is necessary. The nutrient TMDL value, which is expressed as an annual geometric mean, addresses the anthropogenic nutrient inputs which contribute to the exceedances of the chlorophyll *a* restoration target.

Chapter 5.4 of the TMDL report also discusses critical conditions.

"The estimated assimilative capacity is based on annual conditions, rather than critical/seasonal conditions because (a) the methodology used to determine the assimilative capacity does not lend itself very well to short-term assessments, (b) the Department is generally more concerned with the net change in overall primary productivity in the segment, which is better addressed on an annual basis, and (c) the methodology used to determine impairment is based on annual conditions (annual geometric means or arithmetic means)"

Wasteload Allocations (WLAs)

Considerations:

- EPA regulations require that a TMDL include WLAs, which identify the portion of the loading capacity allocated to existing and future point sources [40 CFR §130.2(h)].
- Wasteload allocations must be assigned to each point source discharging the pollutant of concern [40 CFR 130.2(i)]. WLAs can be expressed as lumped or aggregate allocations if appropriate.
- If no point sources are present or if the TMDL recommends a zero WLA for point sources, the WLA must be expressed as zero.
- The wasteload allocations should be sufficient, in consideration of nonpoint source loads, to ensure that the point sources will not cause or contribute to excursions of water quality standards [40 CFR §122.44(d)(1)].

Conclusions:

Polk County and Co- Permittees (FDOT District 1 and the City of Auburndale) are covered by a Phase I NPDES municipal separate storm sewer system (MS4) permit (FLS000015) and areas within their jurisdiction in the Lake Lena watershed may be responsible for a 42 percent total nitrogen reduction in current anthropogenic loading. It should be noted that any MS4 permittee is only responsible for reducing the anthropogenic loads associated with stormwater outfalls that it owns or otherwise has responsible control over, and it is not responsible for reducing other nonpoint source loads in its jurisdiction.

"As noted in Chapter 4, Section 4.2.1 of the TMDL report, there are no active NPDES-permitted facilities located within the Lake Lena watershed that discharge surface water within the watershed. Therefore, the WLA_{wastewater} for the Lake Lena TMDL is "not applicable" because there are no wastewater or industrial wastewater NPDES facilities that discharge directly to Lake Lena."

Load Allocations (LAs)	
<p>Considerations:</p> <ul style="list-style-type: none"> EPA regulations require that a TMDL include LAs, which identify the portion of the loading capacity allocated to existing and future nonpoint sources and to natural background [40 CFR §130.2(g)]. Load allocations may range from reasonably accurate estimates to gross allotments [40 CFR §130.2(g)]. Where it is possible to separate natural background from nonpoint sources, load allocations should be described separately for background and for nonpoint sources. If the TMDL concludes that there are no nonpoint sources and/or natural background, or the TMDL recommends a zero load allocation, the LA must be expressed as zero. 	
<p>Conclusions:</p> <p>The nonpoint sources received LAs to meet the TMDL. A 42 percent reduction is required from nonpoint sources in order to meet the TMDL of 1.14 mg/L annual geometric mean TN for Lake Lena.</p> <p>It should be noted that the load allocation includes loading from stormwater discharges that are not part of the NPDES Stormwater Program</p>	
Margin of Safety (MOS)	
<p>Considerations:</p> <ul style="list-style-type: none"> The statute and regulations require that a TMDL include a margin of safety to account for any lack of knowledge concerning the relationship between load and wasteload allocations and water quality [CWA §303(d)(1)(C), 40 CFR § 130.7(c)(1)]. EPA guidance explains that the MOS may be implicit, i.e. incorporated into the TMDL through conservative assumptions in the analysis, or explicit, i.e. expressed in the TMDL as loadings set aside for the MOS. If the MOS is implicit, the conservative assumptions in the analysis that account for the MOS must be described. If the MOS is explicit, the loading set aside for the MOS must be identified. 	
<p>Conclusions:</p> <p>An implicit margin of safety was used for this TMDL. For additional information pertaining to the MOS, please refer to Section 6.4 of the TMDL report.</p> <p>An implicit margin of safety (MOS) was used in the development of these TMDLs because of the conservative assumptions that were applied. The TMDL was developed using the highest TN annual geometric mean value to calculate the percent reduction.</p>	
Seasonal Variation	
<p>Considerations:</p> <ul style="list-style-type: none"> The statute and regulations require that a TMDL be established with consideration of seasonal variations. The method chosen for considering seasonal variations in the TMDL must be described [CWA §303(d)(1)(C), 40 CFR §130.7(c)(1)]. 	
<p>Conclusions:</p> <p>The estimated assimilative capacity is based on annual conditions, rather than critical/seasonal conditions because (a) the methodology used to determine the assimilative capacity does not lend itself very well to short-term assessments, (b) the Department is generally more concerned with the net change in overall primary productivity in the segment, which is better addressed on an annual basis, and (c) the methodology used to determine impairment is based on annual conditions (annual geometric means or arithmetic means).</p>	
Public Participation	
<p>Considerations:</p> <ul style="list-style-type: none"> EPA regulations require public review [40 CFR §130.7(c)(1)(ii), 40 CFR §25] consistent with State or Tribe's own continuing planning process and public participation requirements. In guidance, EPA has explained that final TMDLs submitted to EPA for review and approval must describe the State/Tribe's public participation process, including a summary of significant comments and the State/Tribe's responses to those comments. 	

Conclusions:

The State's public participation process is consistent with regulations.

Other Considerations

Considerations:

- This section may be needed in the TMDL review in order to describe unique factors or information specific to the TMDL under review, which help explain the basis for EPA's decision.

Conclusions:

N/A


Final Recommendation/Comments

Lake Lena is expected to meet the applicable nutrient criteria and maintain its function and designated use as a Class III water when surface water TN concentrations are reduced to the target concentration, which will address the anthropogenic contributions to the water quality impairment. The approach used to establish the nutrient target and the TMDL, addresses meeting the chlorophyll a target, which is protective of the lake's designated use.

The TMDL presented in this report will constitute the site specific numeric interpretation of the narrative nutrient criterion set forth in paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.), that will replace the otherwise applicable numeric nutrient criteria (NNC) in subsection 62-302.531(2) for this particular water, pursuant to paragraph 62-302.531(2)(a), F.A.C..

The Water Quality Planning Branch recommends that the TMDL be **APPROVED**.

Date: 3/22/16


James D. Giattina
Director, Water Management Division